Ankara University, Faculty of Agriculture , Department of Fisheries and Aquaculture, Programme of Fisheries and Aquaculture

AQS104: Biochemistry

Reference: Nelson, D. L., Lehninger, A. L., & Cox, M. M. (2008). ***Lehninger Principles of Biochemistry (5th edition)***. Macmillan.

AQS104 BIOCHEMISTRY: Weekly Programme	
1. Week: • The foundations of biochemistry • Water	**8. Week:** Principles of metabolic regulation The citric acid cycle
2. Week: • Amino acids, peptides, and proteins • The three-dimensional structure of proteins	**9. Week:** Fatty acid catabolism Aino acid oxidation and the production of urea
3. Week: • Protein function • Enzymes	**10. Week:** Oxidative phosphorylation and photophosphorylation Carbohydrate biosynthesis in plants and bacteria
4. Week: • Carbohydrates and Glycobiology • Nucleotides and Nucleic Acids	**11. Week:** Lipid biosynthesis Biosynthesis of amino acids, nucleotides, and related molecules
5. Week: • DNA-based information technologies • Lipids	**12. Week:** Hormonal regulation and integration of mammalian metabolism Genes and chromosomes
6. Week: Biological membranes and transport Biosignaling	**13. Week:** DNA metabolism RNA metabolism
7. Week: Bioenergetics and biochemical reaction types Glycolysis, gluconeogenesis, and the pentose phosphate pathway	**14. Week:** Protein metabolism Regulation of gene expression

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AQS104: Biochemistry

1. Week:
The Foundations of Biochemistry
Water

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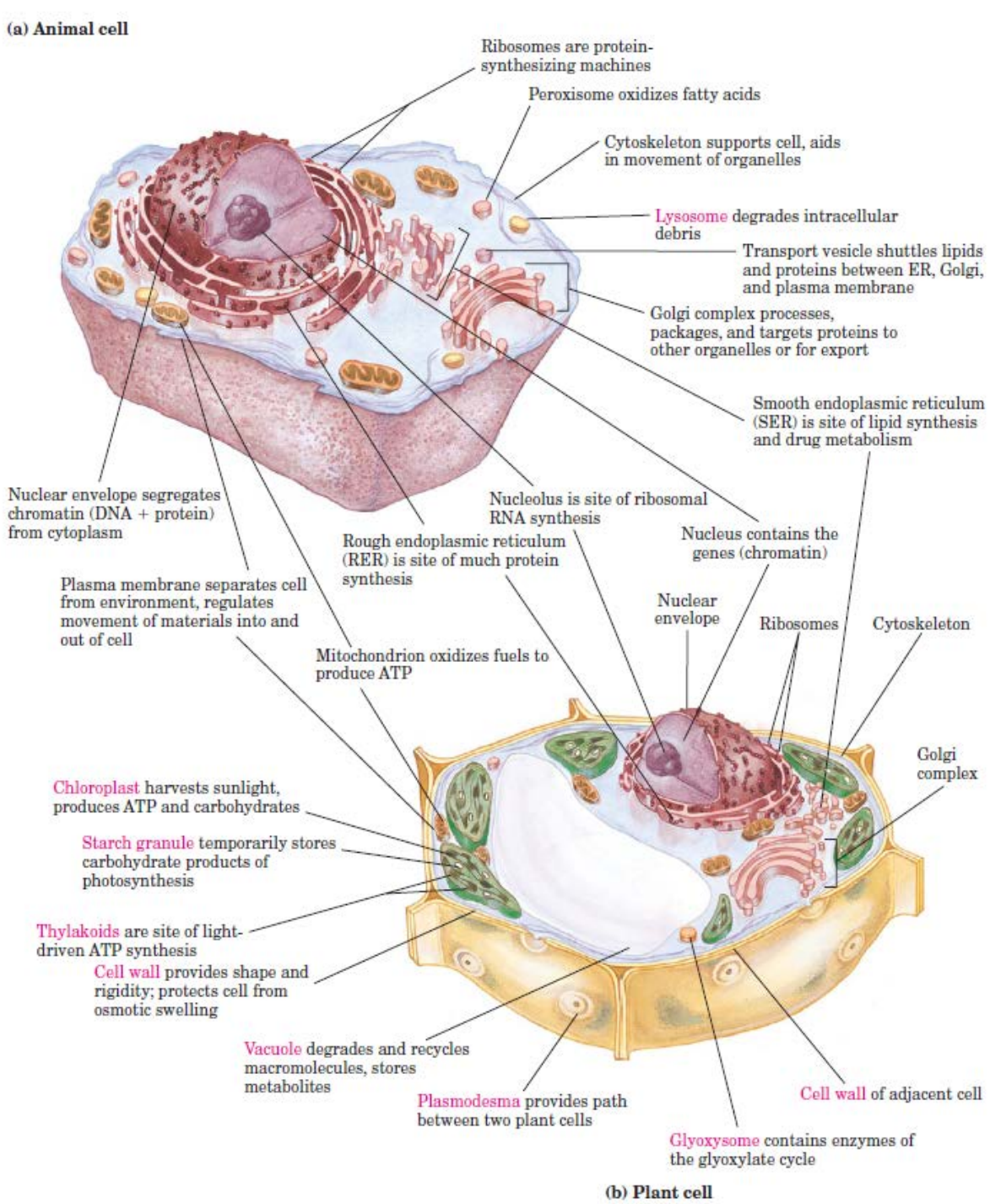

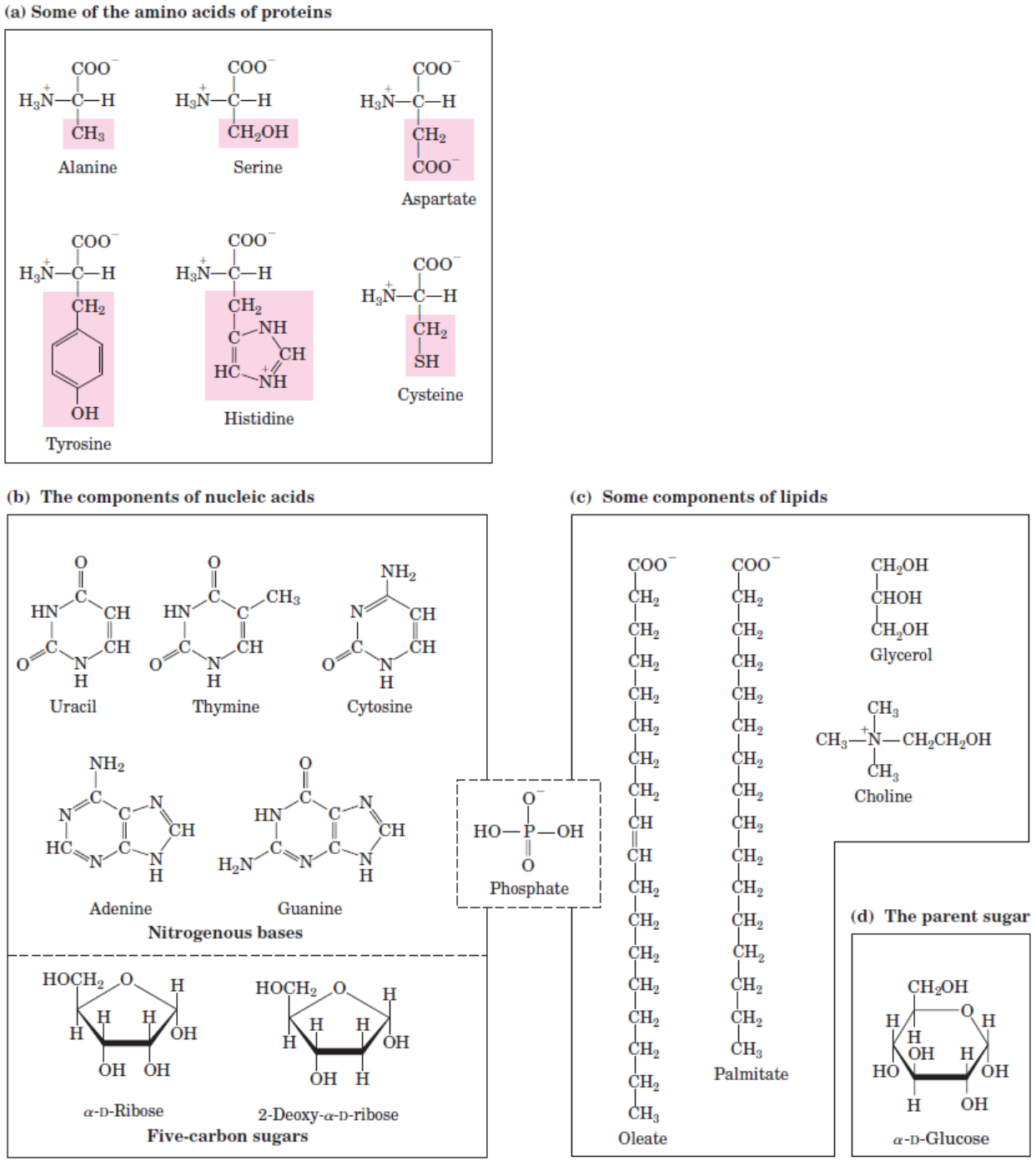

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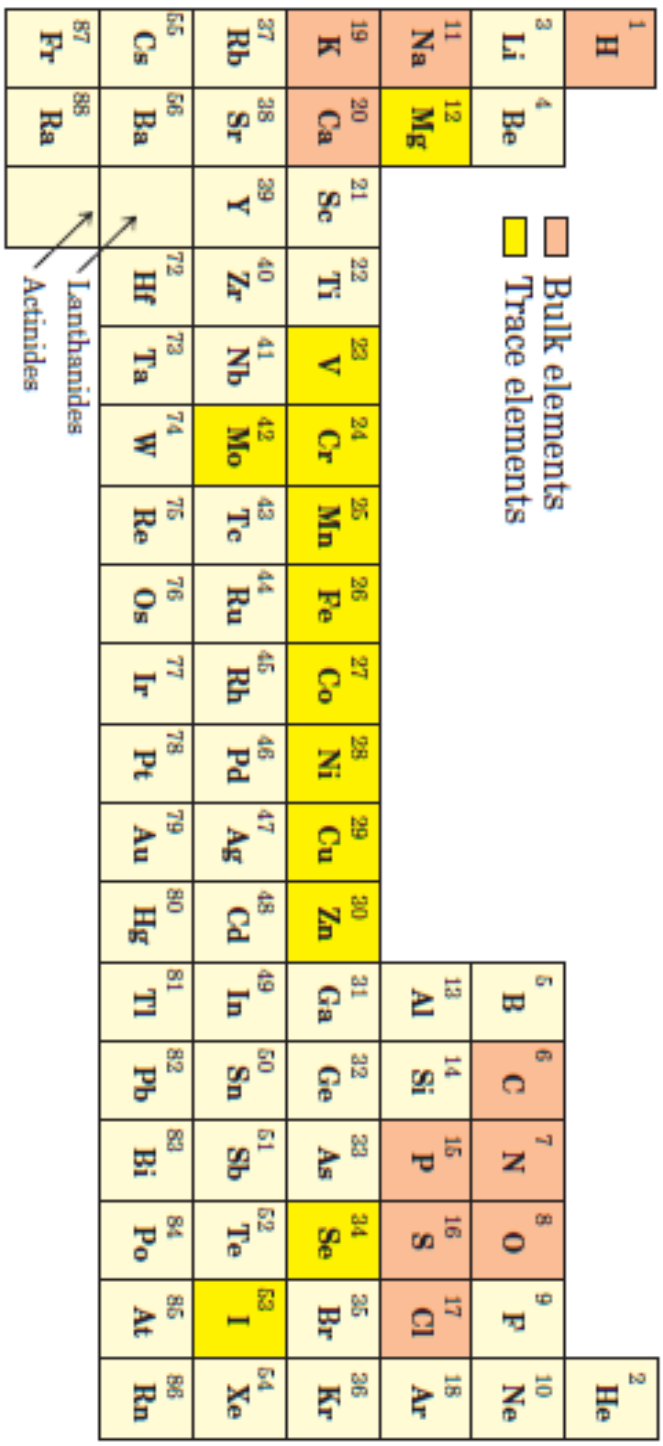

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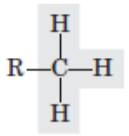
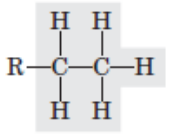
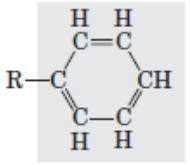
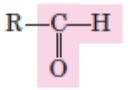
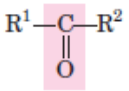
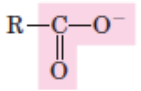
Methyl 

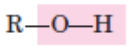
Ethyl 

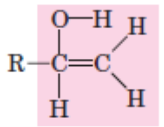
Phenyl 

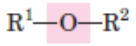
Carbonyl (aldehyde) 

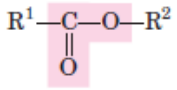
Carbonyl (ketone) 

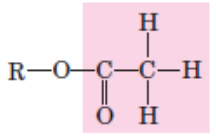
Carboxyl 

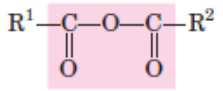
Hydroxyl (alcohol) 

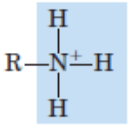
Enol 

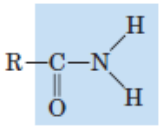
Ether 

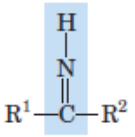
Ester 

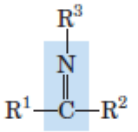
Acetyl 

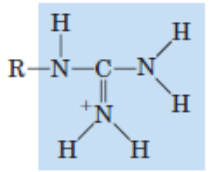
Anhydride (two carboxylic acids) 

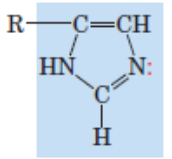
Amino (protonated) 

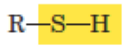
Amido 

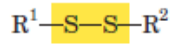
Imine 

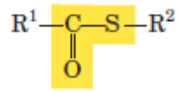
N-Substituted imine (Schiff base) 

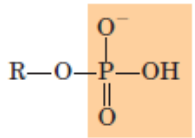
Guanidinium 

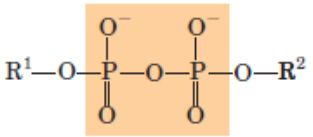
Imidazole 

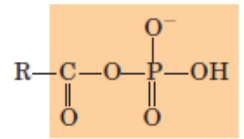
Sulfhydryl 

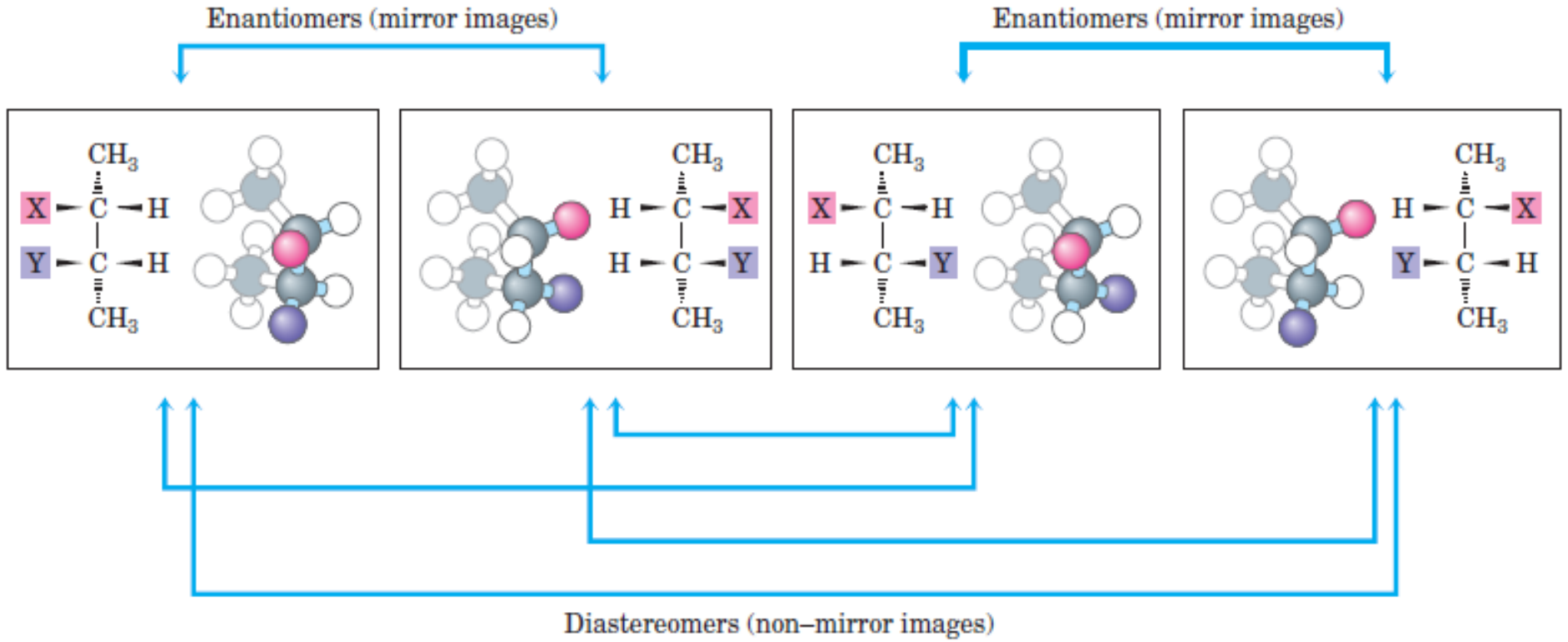
Disulfide 

Thioester 

Phosphoryl 

Phosphoanhydride 

Mixed anhydride (carboxylic acid and phosphoric acid; also called acyl phosphate) 



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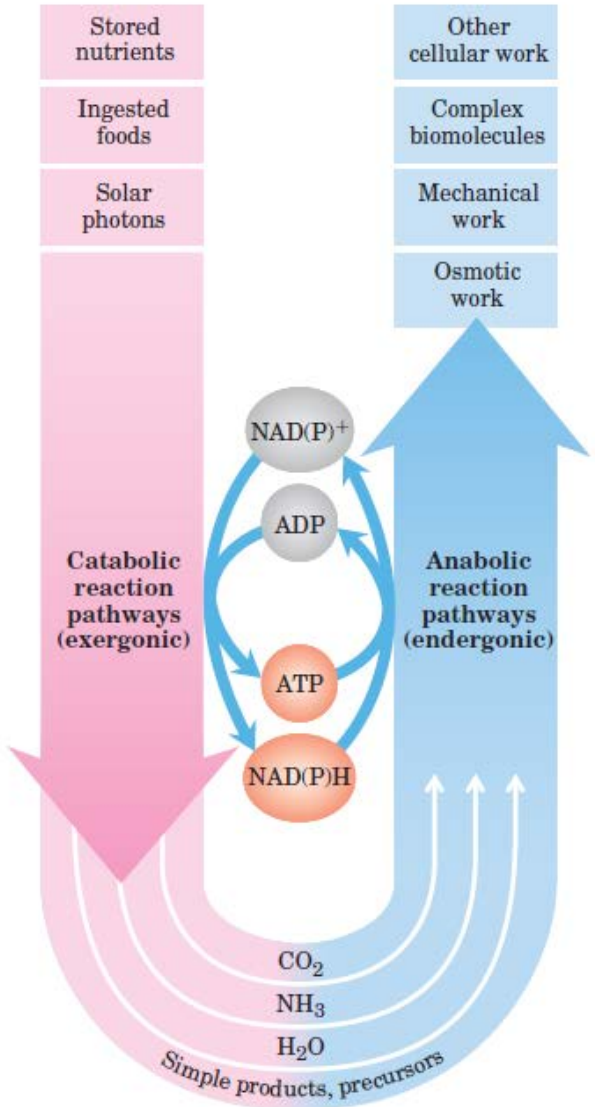

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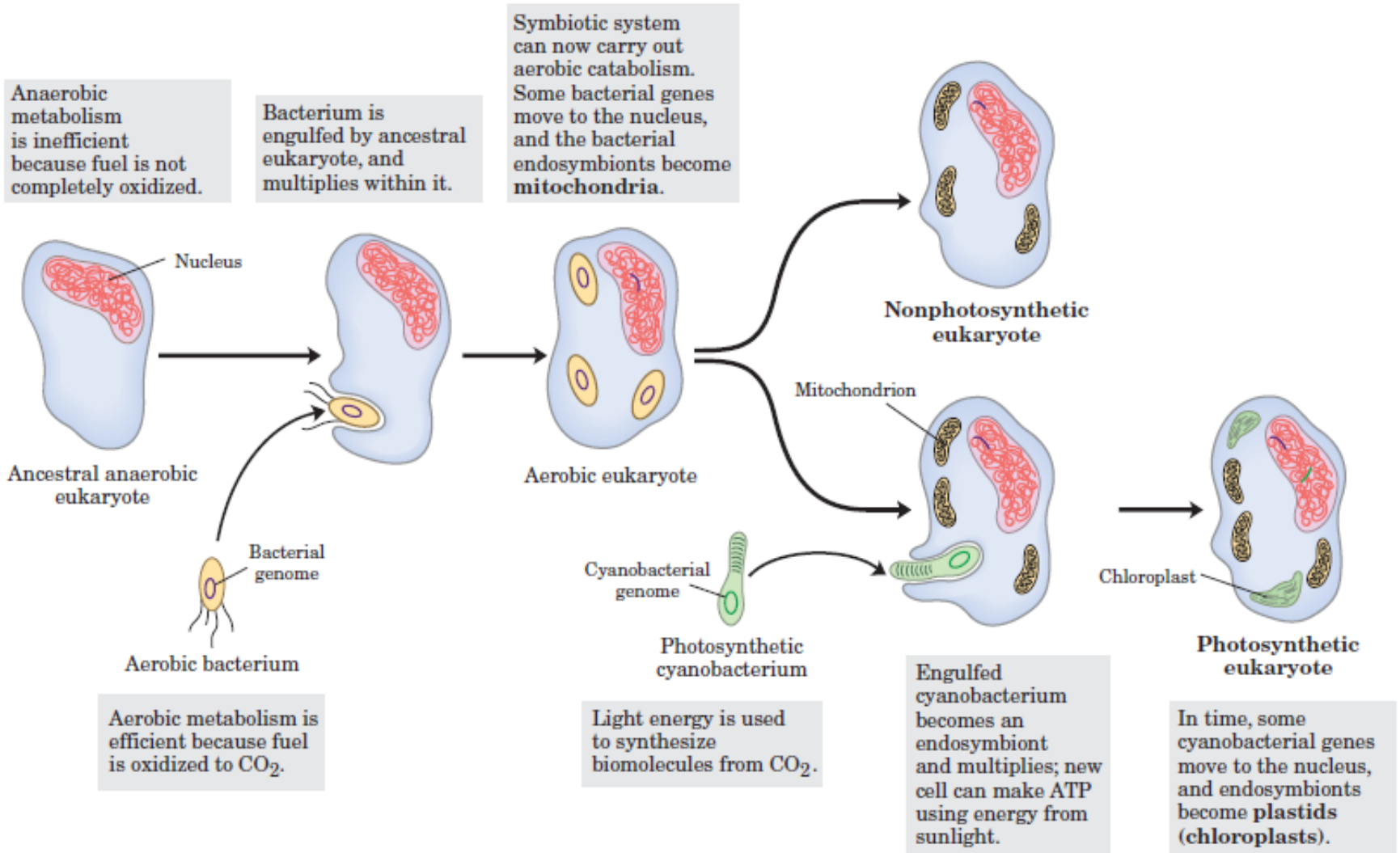

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TABLE 1–2 A Few of the Many Organisms Whose Genomes Have Been Completely Sequenced

Organism	Genome size (nucleotide pairs)	Number of genes	Biological interest
Mycoplasma genitalium	5.8×10^5	4.8×10^2	Smallest true organism
Treponema pallidum	1.1×10^6	1.0×10^3	Causes syphilis
Borrelia burgdorferi	9.1×10^5	8.5×10^2	Causes Lyme disease
Helicobacter pylori	1.7×10^6	1.6×10^3	Causes gastric ulcers
Methanococcus jannaschii	1.7×10^6	1.7×10^3	Archaean; grows at 85 °C!
Haemophilus influenzae	1.8×10^6	1.6×10^3	Causes bacterial influenza
*Archaeoglobus fulgidus**	2.2×10^6	2.4×10^3	High-temperature methanogen
Synechocystis sp.	3.6×10^6	3.2×10^3	Cyanobacterium
Bacillus subtilis	4.2×10^6	4.1×10^3	Common soil bacterium
Escherichia coli	4.6×10^6	4.4×10^3	Some strains are human pathogens
Saccharomyces cerevisiae	1.2×10^7	5.9×10^3	Unicellular eukaryote
Plasmodium falciparum	2.3×10^7	5.3×10^3	Causes human malaria
Caenorhabditis elegans	1.0×10^8	2.3×10^4	Multicellular roundworm
Anopheles gambiae	2.3×10^8	1.3×10^4	Malaria vector
Arabidopsis thaliana	1.2×10^8	3.2×10^4	Model plant
Oryza sativa	3.9×10^8	3.8×10^4	Rice
Drosophila melanogaster	1.2×10^8	2.0×10^4	Laboratory fly ("fruit fly")
Mus musculus domesticus	2.6×10^9	2.7×10^4	Laboratory mouse
Pan troglodytes	3.1×10^9	4.9×10^4	Chimpanzee
Homo sapiens	3.1×10^9	2.9×10^4	Human

Source: RefSeq page for each organism at www.ncbi.nlm.nih.gov/genomes.

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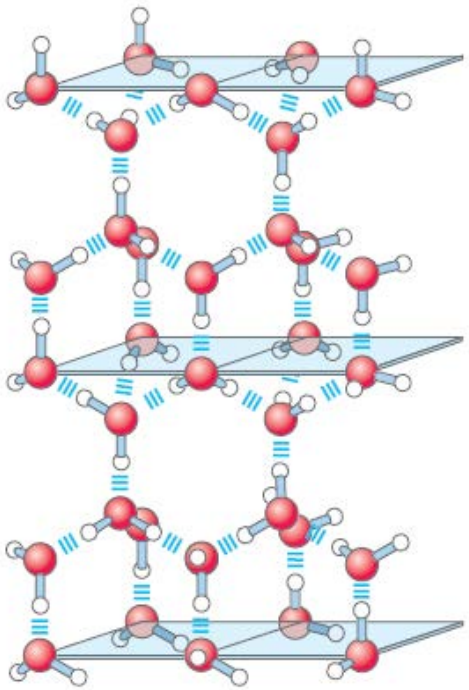
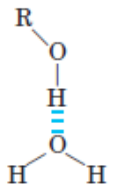
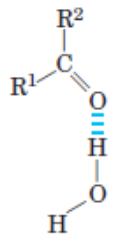


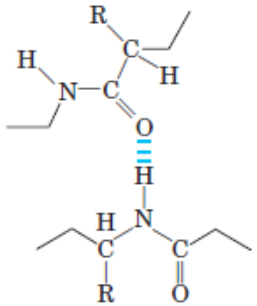
Between the hydroxyl group of an alcohol and water



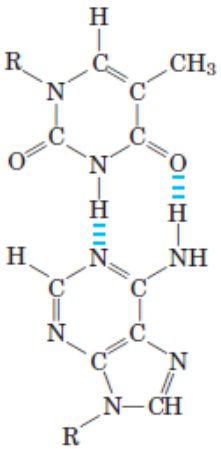
Between the carbonyl group of a ketone and water



Between peptide groups in polypeptides



Between complementary bases of DNA



Thymine

Adenine

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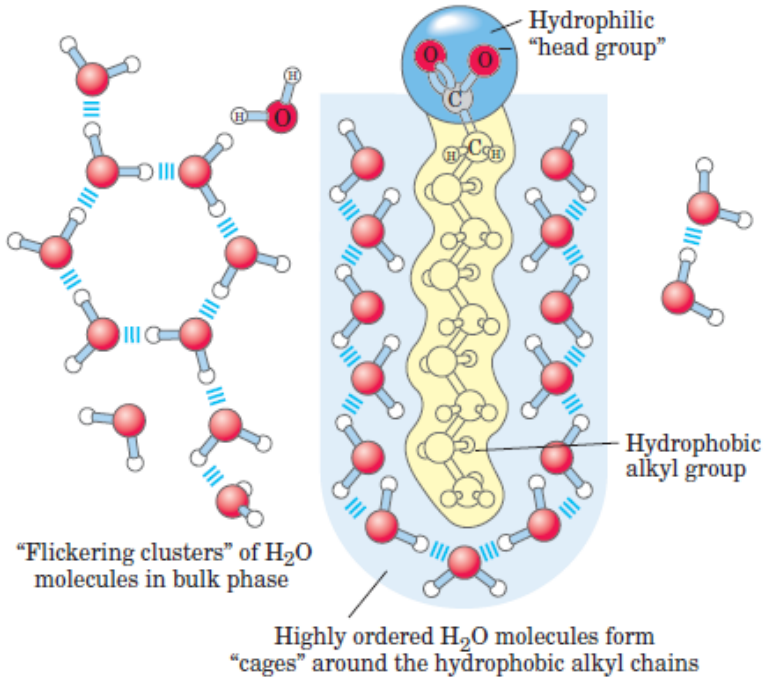

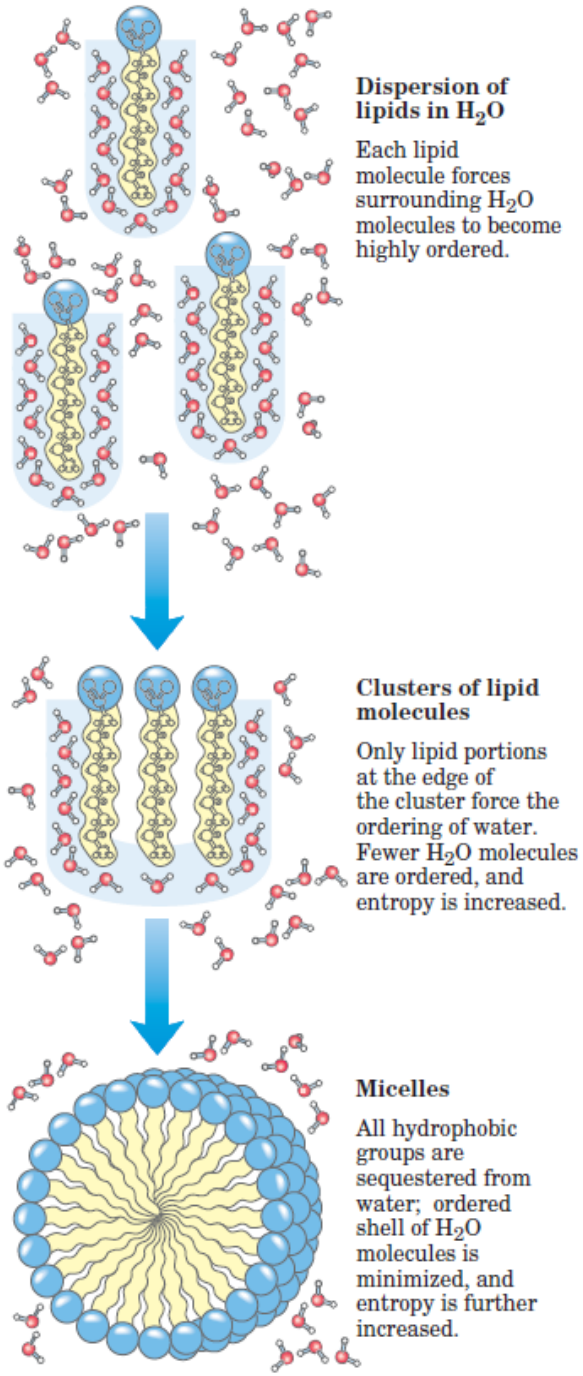

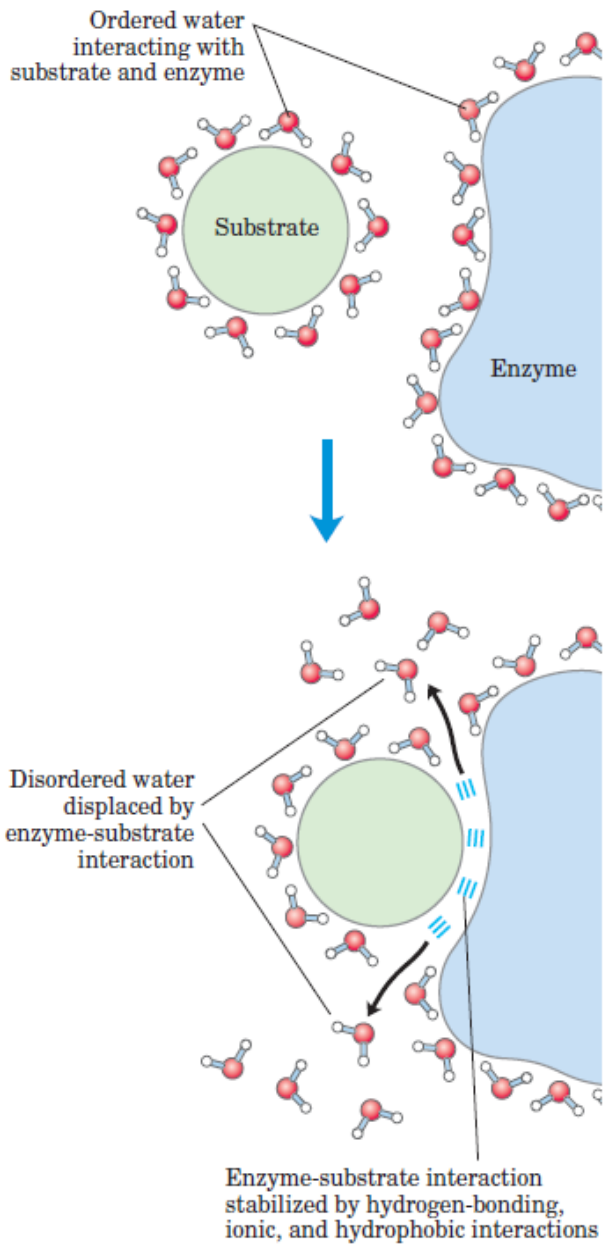

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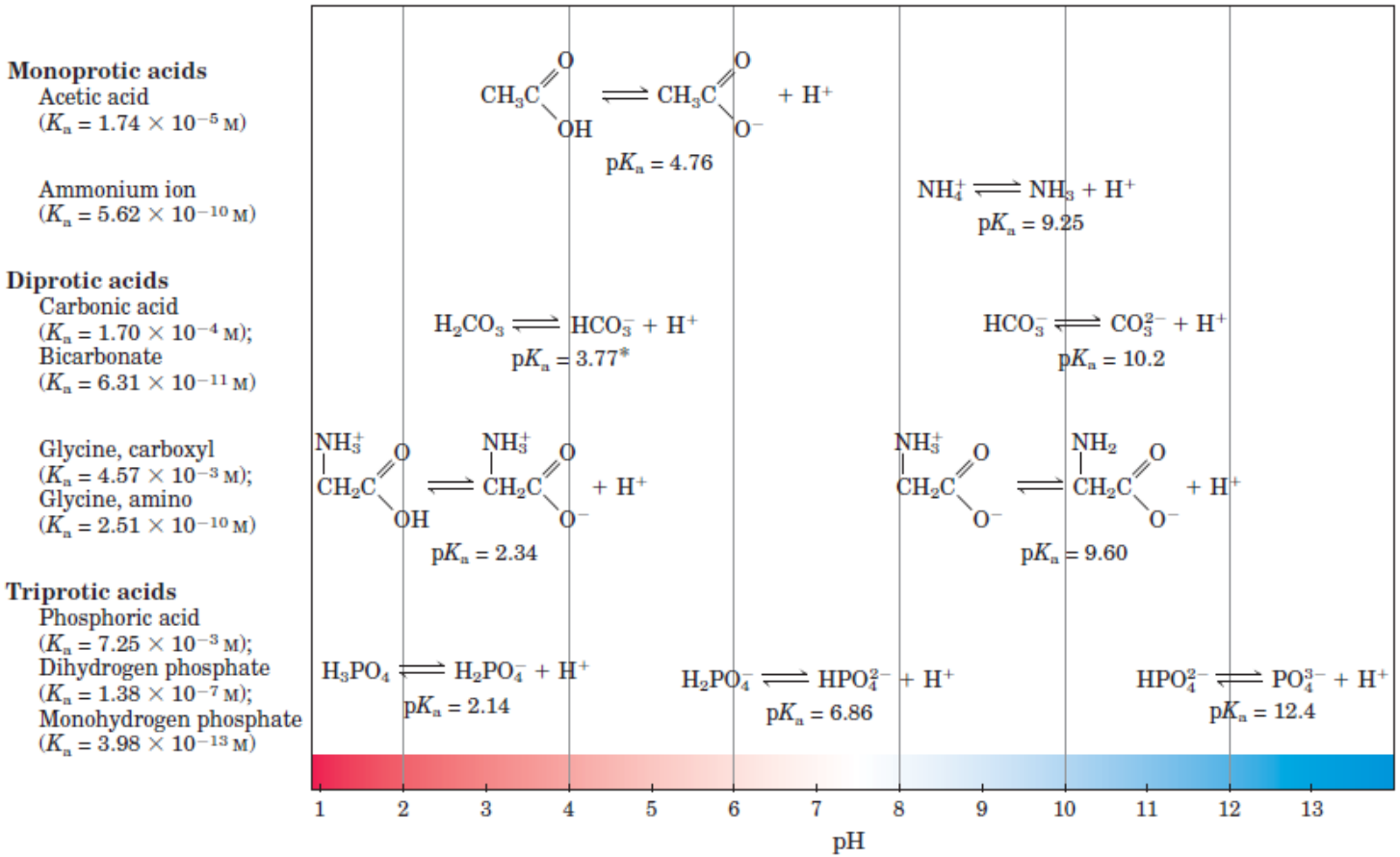

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